Remarks

The various parts of the Office Action (and other matters, if any) are discussed below under appropriate headings.

I. Allowable Subject Matter

The indicated allowability of claims 9 and 16 is noted with appreciation. Claims 9 and 16 have been rewritten in independent form and presumably are now allowable. A few editorial changes have been made in claim 16 to improve its readability.

II. Specification

The Abstract has been amended as requested.

III. Claim Objections

The Examiner has objected to claims 3-7 and 11-16 because of several alleged informalities. More specifically, the Examiner has objected to the term "invisible light" as used in claims 3 and 11, contending that the term is a contradictory term as light by definition is visible to the human eye.

The Examiner is correct that the term "light" oftentimes is used to mean visible light, i.e., light that can be seen by the unaided human eye. The term "light", however, also can be used to mean any electromagnetic radiation. See *Webster's New Riverside Dictionary*. As is evident from the specification, the term "light" is used in the broader context, and is modified by "visible" or "invisible" to differentiate between light that can be seen by the unaided human eye and light that cannot be seen by the unaided human eye, such as infrared light. Accordingly, the manner in which the term "light" is used in the claims is appropriate and consistent with the specification, and withdrawal of the objection is respectfully requested.

IV. Art Rejections

Claims 1-4, 6-8, 11 an 12 have been rejected as being anticipated by or unpatentable over U.S. Patent No. 6,165,181 to *Heilbrun et al. (*hereinafter *Heilbrun)* or U.S. Patent No. 6,143,003 to *Cosman (*hereinafter *Cosman)*. Withdrawal of the art rejections is respectfully requested for at least the following reasons.

Amended claim 1 recites a method for referencing or registering a body part in a camera-assisted, medical navigation system, the method comprising, *inter alia*, the

steps of manually manipulating a light beamer so as to scan a light beam produced thereby across a surface of the body part to sequentially produce a plurality of light marks on the surface of the body part and using a plurality of cameras to detect the light marks on the surface of the body part. Amended claim 10 recites a system for referencing or registering a body part in a medical navigation system, the system comprising, *inter alia*, a manually manipulated light beamer for producing at least one light beam that can be scanned over the surface the body part to produce a plurality of sequential light marks on the surface of the body part, and a plurality of cameras that detect the light marks and provide positional data related to respective locations of the light marks. These features enable a body part to be quickly and accurately referenced or registered in a medical navigation system simply by manually manipulating the light beamer to produce a plurality of sequential light marks on the surface of the body part that can be detected by the cameras. Markers or other fiducials need not be attached to and remain on the patient's skin.[1]

Heilbrun discloses a video localization system for defining the location of a medical instrument relative to features of a medical workspace. In the system, a fiducial structure is positioned in the workspace for defining a three-dimensional coordinate framework, and a pair of two dimensional calibration images of the workspace are obtained using a pair of video cameras. After the calibration images are obtained, the fiducial structure is removed and a computing means applies standard mathematical methods to align the medical workspace coordinate framework (e.g., a workspace coordinate framework using Cartesian coordinates) to a scan coordinate framework (e.g., PET, MRI, CT scans).[2] In performing the alignment, the actual coordinates of each individual fiducial point must be known and must be fixed relative to other fiducial points.[3]

The preferred fiducial structure disclosed in *Heilbrun* includes four rods attached to a plate, wherein eight fiducial points are formed as balls on the rods.[4] In an alternative embodiment, *Heilbrun* discloses that a grid representing the workspace coordinate framework may be projected onto the workspace by means of a light

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[1] Page 4, second and third paragraphs of the present specification

[2] See Abstract of Heilbrun

[3] Column 9, lines 3-5 of Heilbrun

[4] Column 9, lines 11-17 of Heilbrun

projector analogous to a common slide projector.[5] No further disclosure with respect to the grid or the light projector has been found.

As was noted above, *Heilbrun* discloses that the actual coordinates for each of the fiducial points *must be known and must be fixed relative to the other fiducial points*. Therefore, the grid projected onto the workspace must have a known grid spacing, and points along the grid must remain fixed.

In yet another embodiment, *Heilbrun* discloses that a spot projector, such as a laser spot, may be used to determine the workspace coordinates of a particular spot. With respect to the laser spot, *Heilbrun* specifically states that the "spot projector can be aimed by a user to select *a spot* (emphasis added) whose workspace coordinates it is desired to be determine (sic), or automatically by the computing means to indicate the coordinate location of a feature selected from another scan such as a volume scan".[6] No further disclosure with respect to the laser spot has been found. Thus, the only reference made with respect to the laser spot relates to a single spot, i.e., one point. Nowhere has it been shown that *Heilbrun* teaches or suggests manually manipulating a light beamer so as to scan a light beam produced thereby across a surface of the body part to sequentially produce a plurality of light marks on the surface of the body part and using a plurality of cameras to detect the light marks on the surface of the body part.

Cosman does not make up for the deficiencies of *Heilbrun* as a teaching reference vis-a-vis the claims. *Cosman* discloses multiple laser beams that are used for making reference measurements of a patient's body, or part thereof. Each laser beam is generated by a separate laser source, and each laser beam is aimed at a different target.[7] *Heilbrun* in view of *Cosman* does not teach or suggest a method or system wherein a light beamer is manually manipulated so as to scan a light beam produced thereby across a surface of the body part to sequentially produce a plurality of light marks on the surface of the body part a light beamer.

Accordingly, the rejection of the claims should be withdrawn for at least the foregoing reasons.

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[5] Column 10, lines 6-9 of Heilbrun

[6] Column 10, lines 10-19 of Heilbrun

[7] See, e.g., Fig. 1 of Cosman illustrating four laser sources 15, 18, 20, 22, each emitting a laser beam at a different target 17, 19, 21, 23.

V. Conclusion

The application is believed to be in condition for allowance and an early confirmation is earnestly solicited.

Respectfully submitted,

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